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US 4903707 A

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(54) Abstract Title

Bolt for facilitating catheter insertion

(57) A bolt which can be screwed into a skull and through which catheters can pass into a brain consists of a body section 1 and a threaded section 6 which screws into a skull. Three channels 2 tapering in towards each other pass through the body section and connect with narrow channels 5 in the threaded section. The channels in the body section have a threaded top section so that a gripping device can be screwed in and hold a catheter in place. The device is preferably made of a poly ether ether ketone and enables catheters to be conveniently inserted and held in place in a brain to monitor parameters of the brain such as pressure, pH, chemical compounds etc.

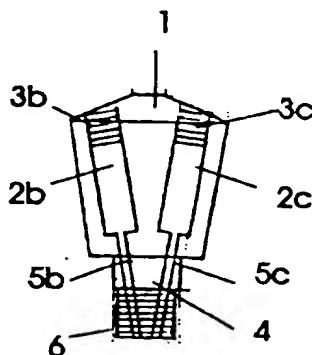


Fig. 2

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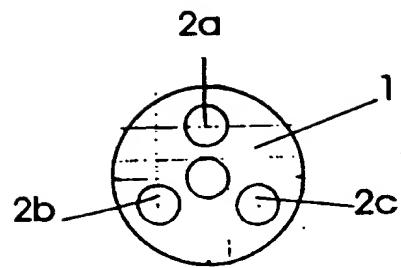


Fig. 1

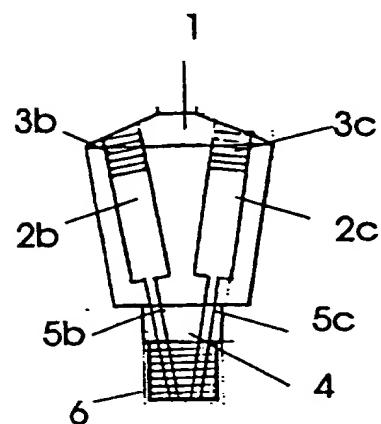


Fig. 2

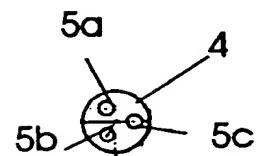


Fig. 3

Bolt

The present invention relates to a device for monitoring the brain, more particularly it relates to a device which facilitates the insertion of catheters and the like into the brain.

When a person suffers brain damage, such as from a head injury or haemorrhage etc. it is expedient to monitor the brain activity so that harmful and potentially harmful events can be detected before permanent damage to the brain can occur. In order to do this a screw device, which has a channel formed within it, is inserted through an incision in the scalp and attached to the skull and a catheter or other probe or measuring device, such as a pressure monitor inserted through the channel into the brain. In this way parameters such as pressure can be monitored. It is known to have bolts with more than one channel in line formed in it and more than one catheter inserted through it. Such bolts are made of titanium for its inertness and strength.

I have now devised an improved bolt for inserting probes into a brain.

According to the invention there is provided a bolt for inserting catheters, probes and the like into a brain, which bolt comprises a substantially circular body section connected to a threaded section, which threaded section is adapted to screw into a tapped hole in a skull, there being a plurality of tapped channels in the body section each of which tapped channel connects to a narrower channel passing through the screw section through which narrower channel is able to pass a catheter, so that, when the bolt is screwed into a tapped hole in a skull, a catheter can be inserted through the tapped channel in the body section and through the channel in the threaded section into the brain.

The tapped section of channel in the body section of the bolt enables a corresponding threaded gripping device to be screwed into it through which gripping device a catheter can pass and can be gripped and held it firmly in place.

The term catheter as used in this specification includes probes, fibres, fibre type measuring devices which incorporate transducers, detectors etc., monitors, chemical detectors etc.

Preferably there are at least three channels in the bolt, which are formed in three planes or dimensions so that catheters passed through them do not interfere with each other. The channels are preferably formed at an angle to each other so that they are furthest apart at the outside of the body section and taper inward towards each other so that they are substantially adjacent where they pass into the brain.

The bolt can be made of any substantially inert rigid material of sufficient strength and it has been found that poly aryl ether ketones and poly ether ether ketones, such as those sold under the trade name PEEK are particularly suitable. Bolts made of this material are strong, rigid and biologically inert and can be sterilised in an autoclave at high temperature or by chemical means and retain their strength and rigidity in use and after sterilisation. These bolts are able to be formed with the degree of accuracy required. Such material overcomes the difficulties of working with metals such as titanium with their well known difficulties of working and because it is non-metallic it has minimal electrical interference with any electrical or electronic scanning or monitoring device inserted into the brain, or computer tomography, magnetic resonance or positron emission tomography external scan.

The bolts of the present invention, because of their relative short length compared with existing devices, enable catheters to be easily inserted to a variety of depths in the brain and held in place. They enable different types of catheters to be inserted at the same time to enable a variety of parameters to be measured simultaneously.

Typical devices which can be inserted into the brain using the device of the present invention include intracranial pressure monitor to measure intracranial pressure, multiparameter sensor to measure brain oxygen, carbon dioxide, pH, temperature etc., microdialysis catheter to measure metabolites, neurotransmitters etc.

The device of the present invention can also enable drugs or other chemicals to be administered to specific locations in the brain and so can be used for treatment as well as diagnosis.

The invention is described in the accompanying drawings in which :-

Fig. 1 is a plan view of the device from the top

Fig. 2 is a side view of the device showing its construction

Fig. 3 is a plan view of the device from below

The bolt comprises a body section (1) formed from PEEK in which are formed channels (2a), (2b) and (2c), these channels have threaded sections (3a), (3b) and (3c). At the lower ends of these channels are narrower channels (5a), (5b) and (5c) which pass through section (4) of the device which has a threaded section (6) as shown.

In use a tapped hole is drilled in a patient's skull and screw section (6) is screwed in. Catheters can then be passed through channels (2) and (5) into the patient's brain. The catheter can be held in place by a gripping device (not shown) which can screw into (3a), (3b) and (3c) to grip the catheter. Thus the catheters can be inserted into the brain and held in place and will allow the required monitoring, measuring or other treatments.

Claims

1. A bolt for inserting catheters and the like into a brain, which bolt comprises a substantially circular body section connected to a threaded section, which threaded section is adapted to screw into a tapped hole in a skull, there being a plurality of tapped channels in the body section each of which tapped channel connects to a narrower channel passing through the screw section through which narrower channel is able to pass a catheter, so that, when the bolt is screwed into a tapped hole in a skull a catheter can be inserted through the tapped channel in the body section and through the channel in the threaded section into the brain.
2. A bolt as claimed in claim 1 which is made from a poly ether ether ketone.
3. A device as claimed in claim 1 or 2 in which there are three channels positioned in three dimensions and which taper inwards towards each other in the direction of the threaded section of the device.
4. A device as claimed in any one of claims 1 to 3 in which there is a threaded gripping device screwed into the threaded section of the said channel which gripping device is able to grip and hold in place a catheter passing therethrough.
5. A bolt as herein before described with reference to the drawings.



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Application No: GB 9721328.4
Claims searched: 1-5

Examiner: L.V.Thomas
Date of search: 20 July 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
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Int Cl (Ed.6): A61B 5/03; A61M 1/00, 25/01, 25/02, 25/04
Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 4903707 (KNUTE ET AL.) see col.3 ll.10-64 and Figs.3 and 4	1
A	US 4629451 (WINTERS ET AL.) see col.2 ll.14-27, col.4 ll.6-9 and Figs.12-14	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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